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PATENT AND TRADEMARK OFFICE

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**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)**INTERNATIONAL APPLICATION NO
PCT/FR99/02010INTERNATIONAL FILING DATE
August 18, 1999PRIORITY DATE CLAIMED
August 18, 1998

TITLE OF INVENTION

METHOD AND DEVICE FOR FURNACE-WORK PRODUCTION OF AN EXTRUDED STRING RIM PORTION ON AN OBJECT AND
ARTICLE COMPRISING SUCH AN OBJECT

APPLICANT(S) FOR DO/EO/US

Gerd CORNILS, Florian FISCHER and Stefan VERBEEK

Applicant herewith submits to the United States Designated/ Elected Office (DO/EO/US) the following items under 35 U.S.C. 371:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the international Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureaus.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 37(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
 - 16a. First Page of WO 00/10793
 - 16b. International Search Report in English (4 pages) and in French (4 pages)
 - 16c. Formal Drawings (6 sheets, Figs. 1-7)

09/529672

416 Rec'd PCT/PTO

18 APR 2000

17. ☒ The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees as follows:

CLAIMS				
(1)FOR	(2)NUMBER FILED	(3)NUMBER EXTRA	(4)RATE	(5)CALCULATIONS
TOTAL CLAIMS	19 - 20	0	X \$ 18.00	\$ 0.00
INDEPENDENT CLAIMS	4 - 3	1	X \$ 78.00	78.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$ 260.00	<input type="checkbox"/>
BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): CHECK ONE BOX ONLY				
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482)			\$ 670	
<input type="checkbox"/> No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))			\$ 760	
<input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO			\$ 970	
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2) to (4)			\$ 96	
<input checked="" type="checkbox"/> Filing with EPO or JPO search report			\$ 840	\$ 840.00
Surcharge of \$130.00 for furnishing the National fee or oath or declaration later than <input checked="" type="checkbox"/> 20 30 mos. from the earliest claimed priority date (37 CFR 1.492(e)).			\$	130.00
TOTAL OF ABOVE CALCULATIONS			=	1,048.00
Reduction by 1/2 for filing by small entity, if applicable. Affidavit must be filed also. (Note 37 CFR 1.9, 1.27, 1.28).			-	\$ 0.00
SUBTOTAL			=	1,048.00
Processing fee of \$130.00 for furnishing the English Translation later than 20 30 mos. from the earliest claimed priority date (37 CFR 1.492(f)).			+	\$
TOTAL FEES ENCLOSED			\$	1,048.00

- ☐ A check in the amount of \$ to cover the above fees is enclosed.
- ☒ Please charge Deposit Account No. 16-1150 in the amount of \$1,048.00 to cover the above fees. A copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 16-1150. A copy of this sheet is enclosed.
18. ☐ Other instructions
n/a
19. ☒ All correspondence for this application should be mailed to
PENNIE & EDMONDS LLP
1667 K STREET, N.W.
WASHINGTON, D.C. 20006
20. ☒ All telephone inquiries should be made to (202) 496-4720

Harry C. Jones, III
NAME

SIGNATURE

20.280

REGISTRATION NUMBER

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DATE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. National Phase of
International Application
No. PCT/FR99/02010

Attorney Docket No.: 3633-489

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Group Art Unit: unassigned

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For: METHOD AND DEVICE FOR
FURNACE-WORK PRODUCTION OF AN
EXTRUDED STRING RIM PORTION ON
AN OBJECT AND ARTICLE
COMPRISING SUCH AN OBJECT

Filed: Herewith

Inventors: Gerd Cornils et al.

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please amend the above-identified application (with reference to the English translation) as follows.

IN THE SPECIFICATION:

Page 1, after the title, insert the heading --BACKGROUND OF THE INVENTION--;

Page 3, after line 37, insert the heading --SUMMARY OF THE INVENTION--.

Page 8, after line 14, insert the heading --BRIEF DESCRIPTION OF THE
DRAWINGS--.

Page 8, after line 33, insert the heading --DETAILED DESCRIPTION OF THE
INVENTION--.

IN THE CLAIMS

At the top of the page, delete "Claims" and insert, at the left margin, "We Claim".

Amend the claims as follows:

1. (Once Amended) [Process] In a process for the fashioning of a portion (3) of a profiled bead (2) extruded along a path onto an object, in particular a pane (1), in which process an initially shapeless mass (4) of material is produced in the portion (3) [in question] and is given the desired final shape by contact with a shaped surface of a moving tool (5), any excess material being automatically expelled from the tool in order to be removed, **[characterized in that]** the improvement wherein the mass (4) of material is produced by the superposition of two segments (2a, 2b) of the extruded strip, with the [following] steps of:

[-] [the] guiding an extrusion die (D) [is guided] along a first segment (2a) of the intended path of a profiled bead (2), including the portion (3) to be fashioned;

[-] moving the die (D) [is taken] away from the object (1) and, [is moved,] relative to the object (1), to an adjacent position of the portion (3) to be fashioned; and

[-] guiding the die (D) [is guided again,] along a second segment (2b) of the path of the profiled bead (2), also including the portion (3) to be fashioned.

2. (Once Amended) Process according to Claim 1 for the fashioning of a corner (3) in the profiled bead (2), especially in a corner of the object, **[characterized in that]** wherein the die (D) is moved relative to the object (1) by changing the relative orientation of the die (D) with respect to the object (1), especially by rotation through [the] a desired angle, **[and in that]** and by guiding the die (D) [is guided] in the new direction thus obtained.

3. (Once Amended) Process according to Claim 2, [**characterized in that**] wherein the first (2a) and/or second (2b) segment extend/extends beyond the perimeter of the object (1) so that the fashioned portion (3) projects beyond [the] an end face of the object (1).

4. (Once Amended) Process according to [any one of the preceding claims, **characterized in that,**] claim 1, wherein after the first segment (2a) has been extruded, the die (D) is moved by passing it over [that] a region of the first segment (2a) which includes the portion (3) to be fashioned.

5. (Once Amended) Process according to [any one of the preceding claims, **characterized in that**] claim 1, wherein the extrudable material continues to be delivered by the die (D) while the latter is being moved.

6. (Once Amended) Process according to [any one of the preceding claims, **characterized in that**] claim 1, wherein the moving tool (5) is applied against the portion (3) to be fashioned just after the die (D) has left that region of the second segment (2b) which includes this portion, in the actual extrusion station (E), without the object (1) being moved, transferred or repositioned.

7. (Once Amended) Process according to Claim 6, [**characterized in that**] wherein the moving tool (5) is automatically brought from a rest position to its working position immediately after the mass has been extruded and the extrusion die (D) has continued its travel, is automatically aligned with the profiled bead (2) and is brought into contact with the shapeless mass (4) in order to fashion it.

8. (Once Amended) [Device] In a device for the fashioning of a portion of a profiled bead (2) extruded onto an object, [-] in particular onto a pane (1), [-] fastened in a treatment station (E), in particular for implementing the process according to Claim 1, in which device a moving calibrated tool (5) [may be] is brought into contact with the said strip portion, comprising an initially shapeless accumulation of material (4), and applies against the latter a shaped surface corresponding to the uniform profile of the profiled bead, and in which device means are provided for cutting and removing the excess material, [**being characterized** by the fact that] the improvement wherein the tool (5) is connect in a locally adjustable manner to [the] a treatment station (E) provided for laying down the profiled bead (2) and [can be] is moved between a rest position and a working position in contact with the object (1) fastened in the treatment station (E), by means of an actuating device (8), and [in that] means (10, 11, 17) are provided for the correct and automatic adjustment of the relative position between the tool (5) and the object (1).

9. (Once Amended) Device according to [Claim 6, **being characterized by the fact that**] claim 8, wherein the means for adjusting the position comprise at least one laying face (17) to be applied against the object (1) and a bearing (10, 11) having a spherical movement allowing adjustment of the position parallel to one face of the object.

10. (Once Amended) Device according to Claim 9, [**being characterized by the fact that**] wherein the bearing having a spherical movement is formed by a ball (10) fastened to a support frame (7) of the tool (5) and by a recess (11) receiving the said ball (10) in [the] a baseplate (12) of the tool (5), which baseplate is made adjustable in a base portion with respect to the support frame (7) by springs (13).

16. (Once Amended) Device according to [one of the preceding device claims, **being characterized by** the fact that] claim 8, wherein the support frame (7) of the tool (5) is adjustable with respect to the treatment station (E) for various shapes of objects.

17. (Once Amended) Device according to device Claim 16, [**being characterized by the fact that**] wherein the actuating device includes a driving means (8) connected to the support frame (7).

18. (Once Amended) [Article] In an article, especially a window, comprising an object (1) provided with a profiled bead (2) extruded onto the object (1) and having a fashioned portion (3), [**characterized in that**] the improvement wherein the fashioned portion (3) consists of a continuous folded ribbon of extruded material, in which ribbon the contiguous surfaces of the fold or folds adhere to each other along a possibly pellicular interface, and which ribbon is fashioned by contact with a shaped surface.

19. (Once Amended) [Article] In an article, especially a window, comprising an object, especially a pane (1), provided with a profiled bead (2) extruded onto the object (1) and having at least one corner portion (3), [**characterized in that at**] the improvement wherein the at least one corner portion consists of the superposition of at least two partial beads (2a, 2b) which adhere to each other along a possibly pellicular interface, and which superposed bead is fashioned by contact with a shaped surface.

[illegible]

An action on the merits of the claims is respectfully requested.

Date APRIL 18, 2000

Harry C. Jones, III 20.280
(Reg. No.)

PENNIE & EDMONDS LLP
1667 K Street, N.W.
Washington, DC 20006
(202) 496-4400

Description

Process and device for fashioning a portion of a
profiled bead extruded onto an object, and article
comprising such an object

The invention relates to the field of the manufacture of objects provided with profiled elements made of plastic, such as windows provided with ornamental or sealing strips. It relates more particularly to a process for fashioning a portion of a profiled bead extruded onto an object, and to articles resulting therefrom, as well as to a device especially designed to implement this process.

It is generally known to deposit profiled beads of polymer, for example along the edge of a pane, by continuous extrusion, and to use them directly as a sealing strip, especially for windows fitted into a frame by bonding. Suitable sections of strips help, on the one hand, to centre the window when fitting it into a frame or chassis, for example into a body opening, and guarantee, on the other hand, the position of the window while the adhesive usually employed is curing. Compared with the injection moulding of such strips, which is also known, extrusion has the advantage of greater flexibility since it is not necessary to keep a specific mould for each shape of pane, but all that is required is to guide an extrusion die of calibrated cross section along the edge of the pane, the extrusion die being controlled by a programmable robot, with a defined, generally continuous, flow of material.

Sometimes it is also required to cover corner parts in the window opening with the bead of the sealing strip. Compared with the main cross section of the profiled bead, which is fixedly predetermined by the calibrated shape of the extrusion die, more material is needed in such corner regions. According to Patent DE-C-196 04 397, there exists an extrusion die whose cross section can automatically increase in the

corner regions of a pane. Furthermore, the die comprises two channels for supplying the polymer, in each of which the volume flow rate may be controlled independently of one another by valves. Overall, the additional material needed compared with the bead of normal profile is extruded in a continuous path with the desired cross section. However, such a die is very expensive to manufacture.

It is also known to subsequently touch up the extruded strip in such regions where modification of the profile is required, or in "critical" regions such as the join region between the start and end of the extrusion.

Certain existing solutions thus modify the cross section of the bead by cutting off a defined portion of the bead in a corner region or join region and by filling the gaps thus created by injecting an additional material which joins up with the profiled bead (EP-B 0,524,060), or add additional material for filling the corners by injection onto the continuous profiled bead of uniform cross section in a work phase after the extrusion (cf. DE-C-195 37 693).

In practice, the windows have hitherto been removed from the extrusion station before the profiled bead is touched up and are repositioned in a separate touch-up station. The extrusion station therefore has the best possible occupancy since, before injection of additional material or partial cutting and filling of the gap created, it is necessary to wait for a hold time until the extruded material has stabilized sufficiently.

It is also already known, from Patent DE 4,445,258 C2, to touch up the join region between the start and end of a profiled bead made of extruded polymer surrounding the edge of a pane by means of a multipart compression mould which executes a closure movement going from the centre of the pane towards the external edge so that the excess material in the join region is expelled to the outside and is detached therefrom by a

cutting edge carried by the compression tool. However,
the particular direction of operation of that known
device leads to a bulky system for which there is not
enough space in the immediate vicinity of an extrusion
station. Thus, all the windows in that device must also
be refitted and repositioned separately.

Another known postforming tool (DE-U-90 11 573)
for profiled beads of extruded polyurethane is also
designed in such a way that the panes must be
positioned with respect to the device and cannot
therefore be touched up directly in the extrusion
station.

Touch-up processes with transfer of the window
furthermore have the drawback that the solutions
proposed do not always give exactly the expected result
with, in particular, visible transition marks on the
postformed region which are due to the addition of
fresh material alongside the earlier extruded material
which has already at least partially cured.

It is therefore desired to find improved
processes, with a more reliable appearance result,
preferably by reducing the cost compared with that
currently borne, in the techniques using postforming or
filling especially by injection moulding, by the
succession of steps of transferring each window
provided with the moulded profiled bead out of the
extrusion station, of fitting and positioning the
following touch-up station and finally of fashioning
the critical portion.

Thus, the object of the invention is to present a
process which markedly improves the touching-up, in
particular by decreasing the hold time for the
postforming of critical regions of a profiled bead,
especially corner regions and/or join regions. A
corresponding device, which is also advantageously as
compact as possible, especially suitable for
implementing this process, may also be proposed.

The subject of the invention is thus a process for
the fashioning of a portion of a profiled bead extruded

onto an object, in particular a pane, in which process an initially shapeless mass of material is produced in the portion in question and is given the desired final shape by contact with a shaped surface of a moving tool, any excess material being automatically expelled from the tool in order to be removed, characterized in that the mass of material is produced by the superposition of two segments of the extruded strip, with the following steps:

10 - the extrusion die is guided along a first segment of the intended path of the profiled bead, including the portion to be fashioned;

15 - the die is taken away from the object and is moved, relative to the object, to an adjacent position of the portion to be fashioned;

 - the die is guided again, along a second segment of the path of the profiled bead, also including the portion to be fashioned.

20 The process according to the invention is characterized by the fact that material needed for the final fashioning is supplied directly at the time of extrusion, so that after the die has left the region in question, the touch-up operation can be started at the same time as the extrusion stops.

25 The saving in production time represents a certain economical advantage.

30 Furthermore, since the touch-up operation is started immediately, any difference in appearance between the region which is extruded in the usual manner and the region which has undergone the additional treatment is lessened, since the material of the extruded part has not yet been cured and/or crosslinked significantly by the time the fashioning of the adjacent part is started.

35 This process is particularly useful for the local production of particular shapes in limited regions of the strip, in particular for corner regions which are more difficult to produce the more acute-angled the corner.

According to one particular embodiment for fashioning a corner, especially an acute-angled corner, the die is moved relative to the object by changing the relative orientation of the die with respect to the object, especially by rotation through the desired angle, and the die is guided, in the new direction thus obtained, along the following side of the object.

In one particular case, the first and/or second segment extend/extends beyond the perimeter of the object so that the fashioned portion projects beyond the end face of the object.

In general, it is not necessary to interrupt the flow of material during intermediate movement of the die.

According to an advantageous variant, the accumulation of material is formed by moving the die, after the first segment has been extruded, by passing it over that region of the first segment which includes the portion to be fashioned. In the region in question, the material thus forms a kind of ribbon folded back on itself, in which the superposed layers (or folds) adhere perfectly to each other.

In this regard, the subject of the invention is also novel products, especially:

- an article, especially a window, comprising an object provided with a profiled bead extruded onto the object and having a fashioned portion, characterized in that the fashioned portion consists of a continuous folded ribbon of extruded material, in which ribbon the opposed surfaces of the fold or folds adhere to each other along a possibly pellicular interface, which ribbon is fashioned by contact with a shaped surface;

- an article, especially a window, comprising an object, especially a pane, provided with a profiled bead extruded onto the object and having at least one corner portion, characterized in that at least one corner portion consists of the superposition of at least two partial beads which adhere to each other along a possibly pellicular interface, which superposed

bead portion is fashioned by contact with a shaped surface.

In fact, depending especially on the plastic used, on the extrusion rate, on the ambient temperature or the ambient moisture content, the material deposited on the first partial bead may be partially modified before the material of the second partial bead has been superposed on it. Thus, the plastic in the fashioned region is in general relatively heterogeneous, although giving the bead sufficient cohesion by the respective layers adhering to each other.

In extreme cases, there may even form on the surface of the first partial bead a kind of skin or film which is completely compatible with the material deposited on top of it just afterwards, but which may be visible if a longitudinal section of the product is examined.

The extruded material is advantageously of the thermoplastic type, for example a thermoplastic elastomer (TPE) or a thermoplastic olefin (TPO). Materials not having an excessive tack are preferred so as to facilitate the fashioning operations, especially the removal of the shaped surface.

With thermoplastics, it may be advantageous to heat the bead portion or portions to be fashioned before and/or during the fashioning.

The object of the invention is also a device for the fashioning of a portion of a profiled bead extruded onto an object - in particular onto a pane - fastened in a treatment station, in particular for implementing the process according to the invention, in which device a moving calibrated tool may be brought into contact with the said strip portion, comprising an initially shapeless accumulation of material, and applies against the latter a shaped surface corresponding to the uniform profile of the profiled bead, and in which device means are provided for cutting and removing the excess material, being characterized by the fact that the tool is connected in a locally adjustable manner to

the treatment station provided for laying down the
profiled bead and can be moved between a rest position
and a working position in contact with the object
fastened in the treatment station, by means of an
5 actuating device, and in that means are provided for
the correct and automatic adjustment of the relative
position between the tool and the object.

According to a preferred embodiment of the
invention, the postforming device will be automatically
10 positioned directly after the extrusion of an
accumulation of material at the respective critical
point along the profiled bead, after the extrusion die
has continued its travel without the window to be
treated having been transferred and also before the
15 extruded material has been cured, in order to give the
desired dimensions to that region of the profiled bead
in question, so that it matches, without any
transition, the dimensions of the adjacent portion of
profiled bead being formed, while any excess material
20 will be expelled and automatically removed.

Thus, for the same occupancy of the extrusion
station, a substantial time saving will be obtained in
the subsequent treatment of the critical regions of the
profiled bead as they can now be formed in line during
25 the continuation of the extrusion process, and
therefore without additional handling of the window
which is positioned only once in the extrusion station.

Further advantages of the process are a
substantial reduction in the risk of damage when
30 handling the windows and a reduction in or even
elimination of the costs of touching up for removing
the excess material from the bead. Finally, the need
for space for the additional touch-up station in the
manufacturing plant also disappears.

35 In the case of filling corner regions, according
to a development of the process, the necessary
accumulation of material will be produced by taking the
extrusion die away from the edge of the window,
rotating it and applying it again at the point of

separation by superposing two profile portions. Because of the plasticity of the material, the accumulation is initially shapeless. However, just after the extrusion die has continued its travel, it will be adjusted to
5 the cross section of the profiled bead by means of the automatically positionable tool.

Further features and advantages of the subject of the invention will emerge from the following detailed description and the illustration of an example of the
10 implementation of a process and of an embodiment of a device according to the invention.

In the example of the postforming of a corner of a profiled bead made of thermoplastic elastomer (TPE) which is deposited on a window:

15 Figure 1 shows a detail of an extrusion station with which a postforming device is associated;

Figure 2 is a view of the corner region immediately before a profiled bead that has just been extruded is postformed;

20 Figure 3 is a view of an embodiment of the postforming tool with an actuating device for applying the tool to the window;

Figure 4 is a partial sectional view of the postforming tool in Figure 2, which is in the working
25 position on the window and on the profiled bead;

Figure 5 is a view of a stop provided for adjusting the postforming tool on the end face of the window - a detail of Figure 3;

Figure 6 is a view of a lower part of the mould
30 with a cutting edge provided for cutting the excess material - a detail of Figure 3; and

Figure 7 is a view of the corner region of Figure 1 after the postforming.

In Figure 1, a pane 1, for example made of
35 monolithic toughened safety glass, is positioned and fixed in an extrusion station E. Also included in this figure, purely schematically, are a support A as well as an extrusion die D which is controlled by a robot. This extrusion die deposits, directly along one edge, a

pane 1. A postforming tool 5, forming part of the extrusion station E, is placed at at least one of the corners of the pane 1. Here, it is connected to the support A by a bracket K, which is merely sketched. Thus, it can work directly on the profiled bead 2 extruded by the die D. The pane need therefore no longer be firstly removed from the support A and then repositioned. A more detailed description of this postforming tool 5 and of its method of operation is given below.

In Figure 2, an accumulation 4 of TPE has been produced at a corner 3 of the pane 1. In the present case, the die D, being guided along a first side of the pane in the direction of the arrow Fa, has for this purpose been brought beyond the corner 3 when it has reached the corner region and has been taken away from the edge of the window. Thus, a first bead segment 2a is formed, which includes the portion to be fashioned into a corner. Next, the die is rotated and again placed on the same corner 3. By guiding the die in the new direction of advance along the following side, in the direction of the arrow Fb, a second bead segment 2b is formed. It is not necessary to interrupt the extrusion process when transferring the die.

The extrudate is therefore applied twice in a limited region, in this case crossing the superposed portions, in a comparable manner at the start and end of the profiled bead, except that the deposition of the upper portion follows immediately the deposition of the lower portion. The bead portion 2b deposited last is on top. However, its material can mix with the covered portion 2a which has not yet been cured.

This produces an accumulation of material 4 which initially is shapeless and is illustrated here purely schematically.

Depending on the speed of movement of the die and the curing kinetics of the extruded material in particular, this shapeless mass, which may have approximately the shape of a ribbon folded back on itself when the flow of polymer has not stopped during transfer of the die, may contain, at the interface between the superposed portions, possibly between the folds of the ribbon, a pellicular interface due to very limited curing of the material, which pellicular interface in no way impairs the mutual adhesion of the segments 2a and 2b and therefore the cohesion of the fashioned region 3, despite its relatively heterogeneous internal structure.

Just after the extrusion die has left this corner region, to continue applying the profiled bead 2, the tool 5 is transferred from its rest position, illustrated in Figure 3, to its working position, illustrated in Figure 4, by a tilting movement, this taking place well before the end of the extrusion process, and therefore without the position or location of the window 1 having to be changed. Although any collision between the die D and the tool 5 is excluded in the rest position, the working position - as clearly shown in Figure 1 - lies in the working region of the extrusion die. In the working position, the tool 5 is brought into contact with the pane 1 and with the profiled bead 2 which can still be fashioned. It gives the accumulated material 4, which may still be seen in Figure 3, its shape and produces the final configuration of the corner of the profiled bead 2, as illustrated in Figure 7.

Since the time between the formation of the shapeless mass 4 and the action of the tool 5 is very short, there is no significant surface curing of the bead and the shaped surface of the tool 5 leaves virtually no trace on either side of the mould at the boundary of the fashioned region, this being an appreciable advantage over the known processes.

An even more detailed discussion of the features of the tool 5 and of its method of operation will be given below. As support 6 for the tool, it is preferred to use a table, or an equivalent, which is firmly connected to the extrusion station E (support A and bracket K in Figure 1). The support frame 7 of the tool is movable, in this case swinging about a pin connected to the base 6. An actuator 8, which here is illustrated by a pneumatic cylinder, is fastened to the support frame 7 and causes the tool 5 to undergo a to-and-fro motion between the working and rest positions.

In addition, the position of the tool is completely adjustable within the station so that various shapes of panes can be treated. The adjustment is illustrated here by the slideways of a carriage. However, the adjustment can also be made in any other suitable manner. Of course, such a tool 5 may be placed, if necessary, at each corner of the pane in the extrusion station. Should, for example, several corners in a profiled bead be requested by the window's purchaser, the corresponding number of compact postforming tools would then preferably be attached to the extrusion station in order to achieve the time-saving advantage associated with the invention.

In the Figure 3, the postforming tool is open, while Figure 4 shows it in the process of working with the closed mould parts. The latter grip with the edge of the pane 1 on three sides and therefore completely enclose the profiled bead 2 in a manner known per se. As is apparent in Figure 1, the movement of the tool 5 towards the pane 1 is preferably executed approximately in the direction of the bisector of the angle at the corner 3.

In the embodiment illustrated, a swivel 9 with a spherical head (ball) 10 rises up from the support frame 7 towards the tool. This ball is set in a recess 11 in a baseplate 12 of the tool. The said baseplate is flexibly supported, some distance from the support frame 7, by means of bearing springs 13 (formed here by

conical helical springs). It is therefore mounted on the support frame 7 while still being able to move in the three directions about the centre of the ball 10. Furthermore, it can be oriented (rotated) in its main plane, at least in a limited fashion. The bearing springs 13 centre it in an initial position. The angular position of the baseplate 12 with respect to the support frame 7 may be preset by means of set screws 14 which are inserted through the bearing springs 13. A temperature probe (not illustrated) may be mounted on the baseplate and serve for regulating a device for heating or for maintaining the temperature of the baseplate.

It is generally advantageous to heat the postforming tool for postforming the thermoplastic elastomers. In particular, it may be useful for the joining regions of the portion of profiled bead to be postformed also to be kept hot so as to obtain a smooth a join as possible. However, the heating cost is not high in the case of the process discussed here, because, between depositing the accumulation of material and the postforming, only a very short time interval has elapsed and the profiled bead has therefore not yet cooled.

A removable stop 15 is solidly attached to the baseplate 12. An enlarged complete view of it is given in detail in Figure 5. The stop clearly forms a dihedron in the sketch. Machined on the upper face of the stop is a sealing rim 16 which is exactly matched to the corner 3 of the pane 1 as well as to the mould for touching up the peripheral end face of the latter. For this purpose, this sealing rim may in particular be provided with a groove. It gradually transforms into a laying surface 17. A chamfer is provided along the outer edge of the laying surface 17, as an engagement bevel for applying the stop 15 against the pane 1.

In Figure 4, it may be clearly seen that the sealing rim 16 is applied against the external edge (end face) of the pane 1 in the working position of the

tool 5. The laying surface 17 is placed flat against the underside of the pane and thus aligns the tool 5 in the plane of the edge of the pane. For this process, no specific driving means is required. As reproduced in the illustration, the profiled bead is applied, by the extrusion die, exactly on the top side of the pane 1 so that, when the stop 15 is engaged on the pane 1, no polymer material can be jammed between its peripheral end face and the sealing rim 16.

Thus, when the tool is brought and pressed against the pane by the actuator 8, the baseplate 12 - and therefore the entire tool 5 - may, together with its movable assembly, be automatically matched precisely to the position of the pane and to any dimensional discrepancies in the cutting and the size of the end faces of the pane.

The stop 15 is preferably composed of a low-friction plastic, for example PTFE, since the stop comes up against the pane 1 from below during tilting of the tool and slides along this underside. The tilting movement may, in general, be also illustrated by a straight insertion movement. Preferably, the tool is then applied obliquely from the side of the pane not provided with the profiled bead.

A lower mould part 18, an enlargement of which is illustrated in the sketch in Figure 6, is furthermore fastened to the baseplate 12. As mentioned above, the profiled bead 2 is only on the top side of the pane 1, with a lip overhanging the perimeter of the pane, and there is no contact with the peripheral end face. The extrudate to be applied must be sufficiently viscous to allow such shaping. The lower mould part 18 is fastened, with respect to the stop 15, in such a way that it supports, from underneath, the region to be postformed (lips) of the profiled bead 2 and at the same time completely covers the stop 15 with respect to the extruded mass. Formed on its usually smooth upper face is a cutting edge 19 having a sawtooth cross section. Its abrupt flank (of steepest slope in

relation to the plane of the pane) is directed towards the profiled bead, and its height corresponds to the desired thickness of the projecting lip of the profiled bead 2. As may be seen in the sketch, the lower mould part makes an angle, the internal side of which once again follows the profile of the end face of the pane at a constant distance from the corner region.

As the upper part of the mould, the tool 5 additionally comprises a punch 20 which may be raised and lowered with respect to the baseplate 12 using a cylinder 21. A rigid connection 22 between the cylinder and the baseplate guarantees that the punch 20 exactly follows the engagement movement as the tool 5 is being applied against the pane 1. On the essentially flat moulding face of the punch 20 there is a gasket 23 applied as an additional thickness to the face of the punch. The thickness of the gasket is predetermined by the desired height of the profiled bead 2 on the pane 1.

In the rest position and during transfer of the tool into its working position, the punch 20 is raised. The opening between the punch 20 and the lower mould part must be large enough for the raised punch 20 and the gasket 23 not to come into contact with the profiled bead 2 while the tool is being brought into the working position.

After the tool has been automatically aligned on the corner of the pane, the punch 20 is lowered onto the pane 1 using the cylinder 21. Thus, the gasket is placed directly on the top side of the pane 1. In the region of accumulation of material, i.e. in the acute angle, a cavity or tunnel is now formed which is open on either side of the corner 3 and the cross section of which corresponds to the normal profile of the profiled bead and is bounded or circumscribed by:

- the top side of the pane (on the contact surface provided);

- the surface of the lower mould part as far as the end of the cutting edge (below the lip);

- the lower face of the compression punch as far as the gasket; and

- the perimeter of the gasket lying on the side facing the edge of the pane.

5 Along its longitudinal direction, the cross section of this tunnel or cavity may be of any desired shape, so that it is possible to obtain, in particular, the desired fashioning in the corner region with a corner-shape distended lip, as is illustrated in Figure
10 7. If necessary, the corner region may also be fashioned with a rib or the like running along the upper face of the profiled bead.

15 The abovementioned outer perimeter of the gasket 23 thus serves for forming and limiting the edge of the profiled bead 2, facing the middle of the pane, in the corner region. It thus also makes an angle which corresponds to the apex angle of the lower mould part and is aligned precisely with the latter. However, in the corner region, this break is sufficiently rounded
20 so that a small expulsion space is formed between the region of material accumulation 4 and the front edge of the gasket. The material expelled towards the middle of the pane during the postforming can fill this space. On the other side, lying beyond the pane 1, the excess
25 material which is expelled into the abovementioned cavity is cut off between the cutting edge 19 and the lower face of the punch 20 and falls out of the tool at the latest during return of the latter to its rest position. Prototypes have demonstrated that, in
30 general, no residue of material continues to adhere to the cutting edge, and that remnants that have adhered may easily be removed. However, the cylinder 21 of the punch 20 must not exert excessively high forces, so that the rigid connection 22 need no longer be of a
35 particularly robust design.

Moreover, the stop 15, the lower mould part 18 with the cutting edge 19 and the face of the punch 20 with the gasket 23 are components of the tool which must be manufactured specifically for each shape of

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Claims

1. Process for the fashioning of a portion (3) of a profiled bead (2) extruded onto an object, in particular a pane (1), in which process an initially shapeless mass (4) of material is produced in the portion (3) in question and is given the desired final shape by contact with a shaped surface of a moving tool (5), any excess material being automatically expelled from the tool in order to be removed, **characterized in that** the mass (4) of material is produced by the superposition of two segments (2a, 2b) of the extruded strip, with the following steps:

- the extrusion die (D) is guided along a first segment (2a) of the intended path of the profiled bead (2), including the portion (3) to be fashioned;

- the die (D) is taken away from the object (1) and is moved, relative to the object (1), to an adjacent position of the portion (3) to be fashioned;

- the die (D) is guided again, along a second segment (2b) of the path of the profiled bead (2), also including the portion (3) to be fashioned.

2. Process according to Claim 1 for the fashioning of a corner (3) in the profiled bead (2), especially in a corner of the object, **characterized in that** the die (D) is moved relative to the object (1) by changing the relative orientation of the die (D) with respect to the object (1), especially by rotation through the desired angle, **and in that** the die (D) is guided in the new direction thus obtained.

3. Process according to Claim 2, **characterized in that** the first (2a) and/or second (2b) segment extend/extends beyond the perimeter of the object (1) so that the fashioned portion (3) projects beyond the end face of the object (1).

4. Process according to any one of the preceding claims, **characterized in that**, after the first segment (2a) has been extruded, the die (D) is moved by passing

it over that region of the first segment (2a) which includes the portion (3) to be fashioned.

5. Process according to any one of the preceding claims, **characterized in that** the extrudable material
5 continues to be delivered by the die (D) while the latter is being moved.

6. Process according to any one of the preceding claims, **characterized in that** the moving tool (5) is
10 applied against the portion (3) to be fashioned just after the die (D) has left that region of the second segment (2b) which includes this portion, in the actual extrusion station (E), without the object (1) being moved, transferred or repositioned.

7. Process according to Claim 6, **characterized**
15 **in that** the moving tool (5) is automatically brought from a rest position to its working position immediately after the mass has been extruded and the extrusion die (D) has continued its travel, is automatically aligned with the profiled bead (2) and is
20 brought into contact with the shapeless mass (4) in order to fashion it.

8. Device for the fashioning of a portion of a profiled bead (2) extruded onto an object - in particular onto a pane (1) - fastened in a treatment
25 station (E), in particular for implementing the process according to Claim 1, in which device a moving calibrated tool (5) may be brought into contact with the said strip portion, comprising an initially shapeless accumulation of material (4), and applies
30 against the latter a shaped surface corresponding to the uniform profile of the profiled bead, and in which device means are provided for cutting and removing the excess material, **being characterized** by the fact that the tool (5) is connected in a locally adjustable
35 manner to the treatment station (E) provided for laying down the profiled bead (2) and can be moved between a rest position and a working position in contact with the object (1) fastened in the treatment station (E), by means of an actuating device (8), and in that means

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15. Device according to one of the previous device claims, **being characterized by** the fact that the tool (5) includes a cutting edge (19) for cutting the excess material from the fashioned portion of the profiled bead (2).

16. Device according to one of the preceding device claims, **being characterized by** the fact that the support frame (7) of the tool (5) is adjustable with respect to the treatment station (E) for various shapes of objects.

17. Device according to device Claim 16, **being characterized by** the fact that the actuating device includes a driving means (8) connected to the support frame (7).

18. Article, especially a window, comprising an object (1) provided with a profiled bead (2) extruded onto the object (1) and having a fashioned portion (3), **characterized in that** the fashioned portion (3) consists of a continuous folded ribbon of extruded material, in which ribbon the contiguous surfaces of the fold or folds adhere to each other along a possibly pellicular interface, which ribbon is fashioned by contact with a shaped surface.

19. Article, especially a window, comprising an object, especially a pane (1), provided with a profiled bead (2) extruded onto the object (1) and having at least one corner portion (3), **characterized in that** at least one corner portion consists of the superposition of at least two partial beads (2a, 2b) which adhere to each other along a possibly pellicular interface, which superposed bead is fashioned by contact with a shaped surface.

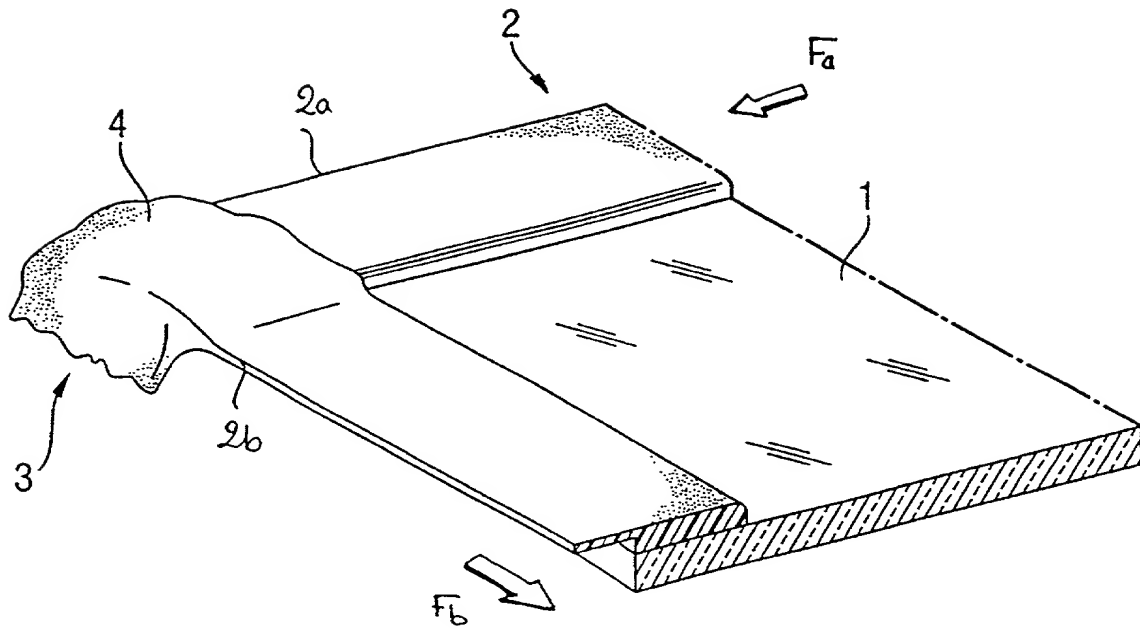
Abstract

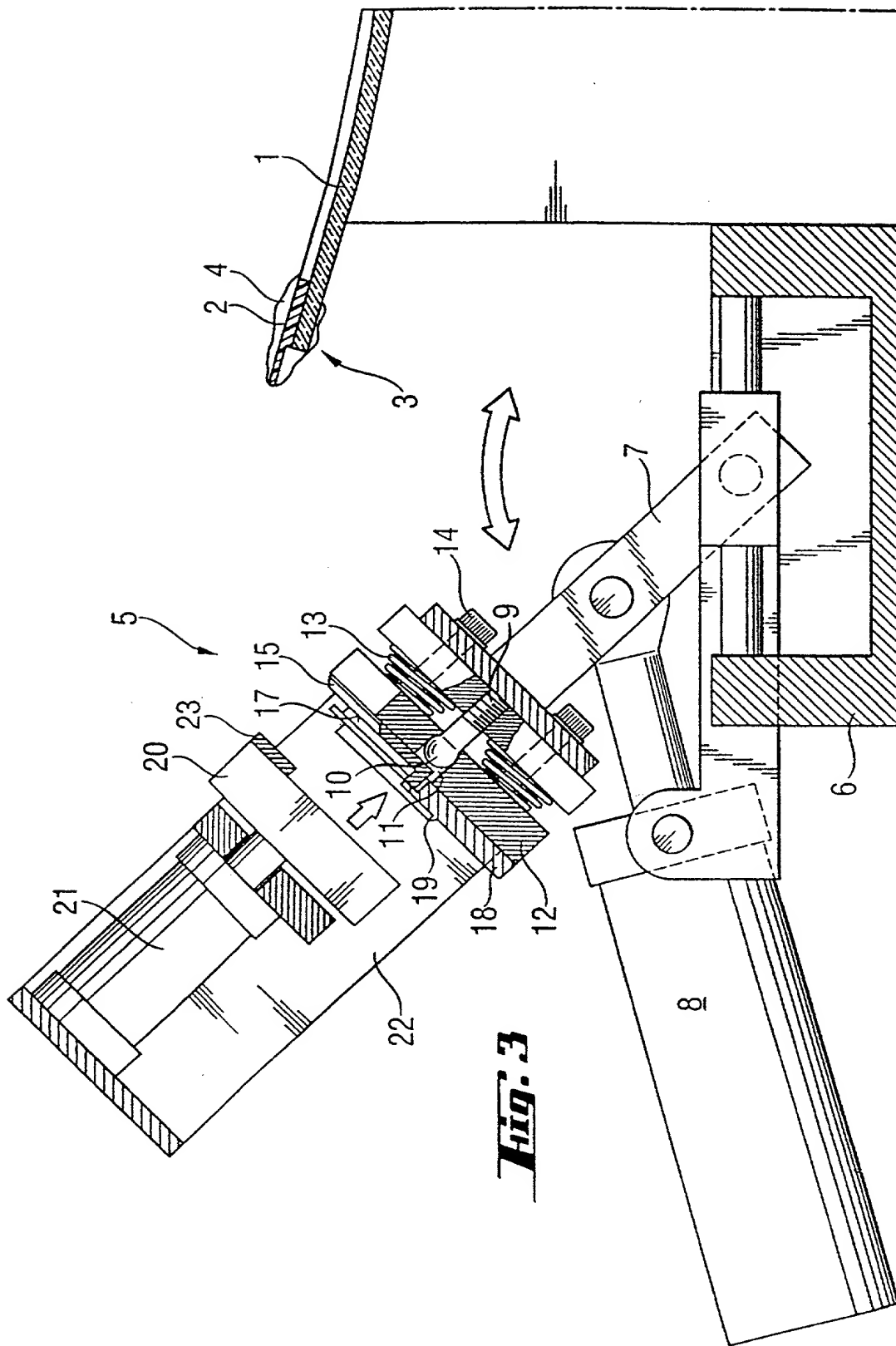
In a process for fashioning a portion of a profiled bead (2), which has been extruded onto an object, in particular a pane (1), fastened in a treatment station (E), in which process an initially shapeless accumulation of material (4) is produced in the portion in question, which accumulation of material is given a final shape corresponding to the uniform cross section of the profiled bead (2) by means of a moving tool (5), any excess material being expelled in order to be removed, the mass of material (4) is produced by the superposition of two portions of the extruded strip, the second portion being deposited after the die (D) has been moved and repositioned. Advantageously, the tool (5) is, according to the invention, automatically aligned on the profiled bead (2), immediately after the accumulated material (4) has been extruded and after the extrusion die (D) has continued its travel, without moving the object, and is brought into contact with this bead.

Also described is a device especially suitable for implementing this process.

[Figure 1]



**Fig. 2**

**Fig. 3**



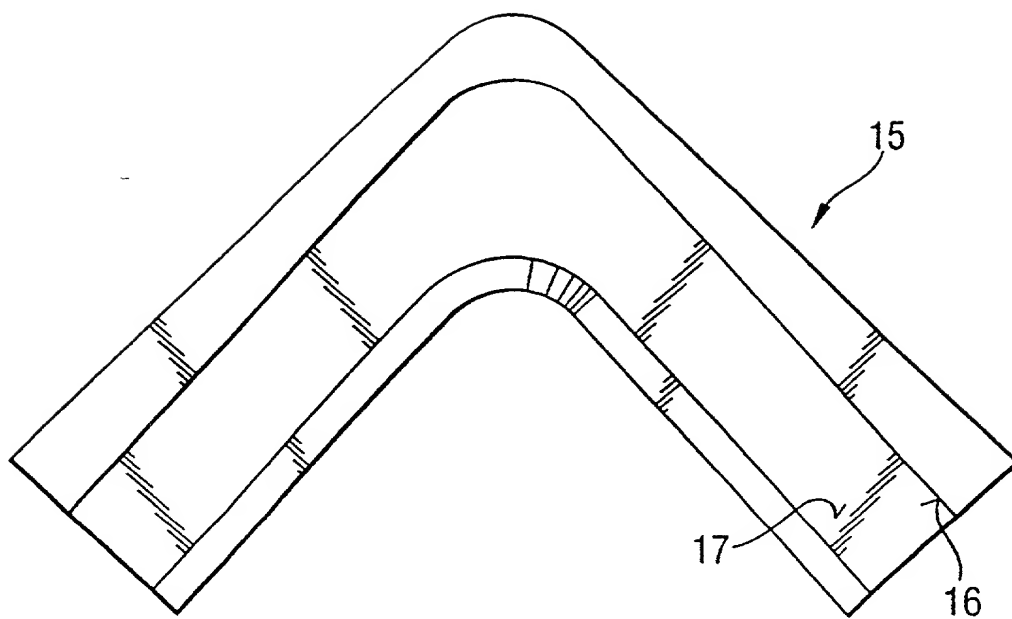


Fig. 5

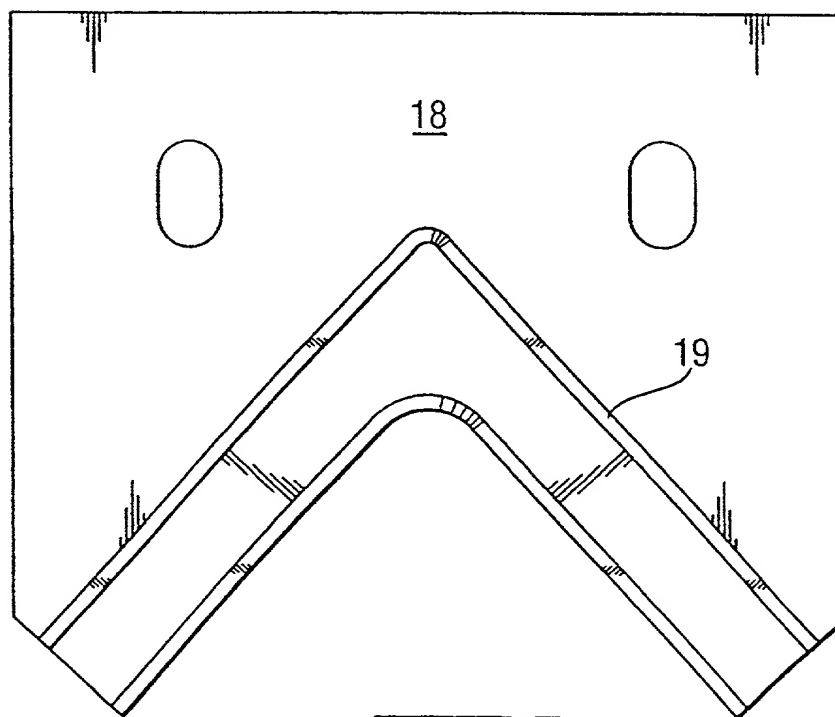


Fig. 6

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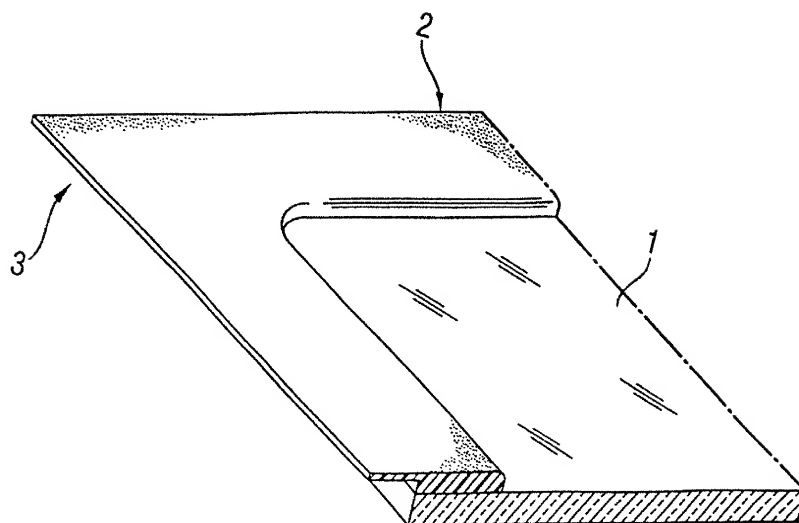


Fig. 7

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As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below at 201 et seq. underneath my name.

I believe I am the original, first and sole inventor if only one name is listed at 201 below, or an original, first and joint inventor if plural names are listed at 201 et seq. below, of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND DEVICE FOR FURNACE-WORK PRODUCTION OF AN EXTRUDED STRING RIM PORTION ON AN OBJECT AND ARTICLE COMPRISING SUCH AN OBJECT

and for which a patent application:

- ☒ is attached hereto and includes amendment(s) filed on *(if applicable)*
☐ was filed in the United States on as Application No. *(for declaration not accompanying application)*
 with amendment(s) filed on *(if applicable)*
☒ was filed as PCT international Application No. PCT/FR99/02010 on August 18, 1999 and was amended under PCT Article 19 on *(if applicable)*

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

EARLIEST FOREIGN APPLICATION(S), IF ANY, FILED PRIOR TO THE FILING DATE OF THE APPLICATION			
APPLICATION NUMBER	COUNTRY	DATE OF FILING (day, month, year)	PRIORITY CLAIMED
DE 198 37 348.1	Germany	18 August 1998	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
			YES <input type="checkbox"/> NO <input type="checkbox"/>

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below.

APPLICATION NUMBER	FILING DATE

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION SERIAL NO.	FILING DATE	STATUS		
		PATENTED	PENDING	ABANDONED

POWER OF ATTORNEY: As a named inventor, I hereby appoint S. Leslie Misrock (Reg. No. 18872), Harry C. Jones, III (Reg. No. 20280), Berj A. Terzian (Reg. No. 20060), David Weild, III (Reg. No. 21094), Jonathan A. Marshall (Reg. No. 24614), Barry D. Rein (Reg. No. 22411), Stanton T. Lawrence, III (Reg. No. 25736), Charles E. McKenney (Reg. No. 22795), Philip T. Shannon (Reg. No. 24278), Francis E. Morris (Reg. No. 24615), Charles E. Miller (Reg. No. 24576), Gidon D. Stern (Reg. No. 27469), John J. Lauter, Jr. (Reg. No. 27814), Brian M. Poissant (Reg. No. 28462), Brian D. Coggio (Reg. No. 27624), Rory J. Radding (Reg. No. 28749), Stephen J. Harbulak (Reg. No. 29166), Donald J. Goodell (Reg. No. 19766), James N. Palik (Reg. No. 25510), Thomas E. Friebe (Reg. No. 29258), Laura A. Coruzzi (Reg. No. 30742), Jennifer Gordon (Reg. No. 30753), Allan A. Fanucci (Reg. No. 30256), Geraldine F. Baldwin (Reg. No. 31232), Victor N. Balancia (Reg. No. 31231), Samuel B. Abrams (Reg. No. 30605), Steven I. Wallach (Reg. No. 35402), Marcia H. Sundeen (Reg. No. 30893), Paul J. Zegger (Reg. No. 33821), Edmond R. Bannon (Reg. No. 32110), Bruce J. Barker (Reg. No. 33291), Adriane M. Antler (Reg. No. 32605), Thomas G. Rowan (Reg. No. 34419), James G. Markey (Reg. No. 31636), Thomas D. Kohler (Reg. No. 32797), Scott D. Stimpson (Reg. No. 33607), Gary S. Williams (Reg. No. 31066), William S. Galliani (Reg. No. 33885), Ann L. Gisolfi (Reg. No. 31956), Todd A. Wagner (Reg. No. 35399), Scott B. Familant (Reg. No. 35514), Kelly D. Talcott (Reg. No. 39582), Francis D. Cerrito (Reg. No. 38100), Anthony M. Inogna (Reg. No. 35203), Brian M. Rothery (Reg. No. 35340), Brian D. Siff (Reg. No. 35679), and Alan Tenenbaum (Reg. No. 34939), all of Pennie & Edmonds LLP, whose addresses are 1155 Avenue of the Americas, New York, New York 10036, 1667 K Street N.W., Washington, DC 20006 and 3300 Hillview Avenue, Palo Alto, CA 94304, and each of them, my attorneys, to prosecute this application, and to transact all business in the Patent and Trademark Office connected therewith.

SEND CORRESPONDENCE TO:

PENNIE & EDMONDS LLP
 1667 K Street, N.W.
 Washington, D.C. 20006

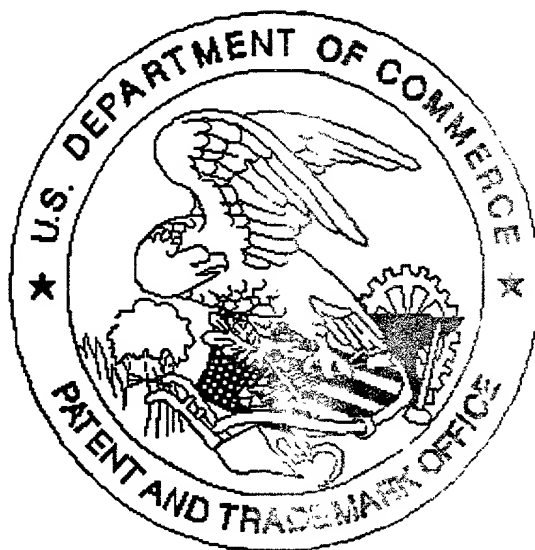
DIRECT TELEPHONE CALLS TO:
 PENNIE & EDMONDS LLP DOCKETING
 (202) 496-4721

100 2 0 1	FULL NAME OF INVENTOR	LAST NAME <u>CORNILS</u>	FIRST NAME <u>Gerd</u>	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY <u>Merzenich-Girbelsrath</u> <i>DEX</i>	STATE OR FOREIGN COUNTRY Germany	COUNTRY OF CITIZENSHIP Germany	
	POST OFFICE ADDRESS	STREET Dechant-Fabry-Strasse 48	CITY Merzenich-Girbelsrath	STATE OR COUNTRY Germany	ZIP CODE D-52399
200 2 0 2	FULL NAME OF INVENTOR	LAST NAME <u>FISCHER</u>	FIRST NAME <u>Florian</u>	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY <u>Aachen</u> <i>DEX</i>	STATE OR FOREIGN COUNTRY Germany	COUNTRY OF CITIZENSHIP Germany	
	POST OFFICE ADDRESS	STREET Ottostrasse 80	CITY Aachen	STATE OR COUNTRY Germany	ZIP CODE D-52070
300 2 0 3	FULL NAME OF INVENTOR	LAST NAME <u>VERBEEK</u>	FIRST NAME <u>Stefan</u>	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY <u>Waldfeucht-Haaren</u> <i>DEX</i>	STATE OR FOREIGN COUNTRY Germany	COUNTRY OF CITIZENSHIP Germany	
	POST OFFICE ADDRESS	STREET Johannesstrasse 28	CITY Waldfeucht-Haaren	STATE OR COUNTRY Germany	ZIP CODE D-52525
200 2 0 4	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	STREET	CITY	STATE OR COUNTRY	ZIP CODE
200 2 0 5	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	STREET	CITY	STATE OR COUNTRY	ZIP CODE
200 2 0 6	FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME	
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